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**SCOLODESMUS AND RELATED AFRICAN MILLIPED GENERA
 (POLYDESMIDA: STRONGYLOSOMIDAE)**

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One of the most prominent of the early students of African diplopods was the late O. F. Cook, a naturalist of varied interests whose published papers reflect a remarkable sense of taxonomic acumen. Unfortunately, however, many of Cook's milliped contributions show a wide range in the scale of usefulness. Some are examples of systematic excellence; others have become the utter despair of his successors! Dr. Cook evidently planned to follow the brief preliminary diagnostic papers with complete descriptions and illustrations, but, regrettably, the expectation was never fulfilled, with the result that most of his African and Indonesian genera and species have never been recognized by later workers.

From time to time Cook's type specimens are found in the collection of the U. S. National Museum, where they were deposited by him intermingled at random with hundreds of vials of unworked material. I have already redescribed and illustrated several of these shadowy species, and devote this paper to still another. It has been necessary to review generally the known African Strongylosomoid genera, and in consequence I find that a considerable number of new combinations and changes must be effected.

I wish to acknowledge my debt to Dr. E. A. Chapin for the loan of specimens, and to Dr. I. D. Wilson for providing facilities for study.

Genus Scolodesmus Cook

Scolodesmus Cook, 1895, Proc. U. S. Nat. Mus., vol. 18, p. 97; Proc. U. S. Nat. Mus., vol. 20, p. 696 (type, *S. grallator* Cook).

Duseviulisoma Brolemann, 1920; in: Alluaud & Jeannel, Voy. Afr. Or., Myr., p. 165.—Attems, 1931, Zoologica (Stuttgart), vol. 30 (¾), p. 129 (type, *Strongylosoma iuliforme* Carl).

Dyseviulisoma Attems, 1929, Rev. Bot. Zool. Afr., vol. 17, p. 275; 1937, Das Tierreich, lief. 68, p. 209.

The name *Scolodesmus* was proposed very casually—in the body of a key to the African Strongylosomoid genera. The specific name *grallator* was also given (in a combined generic-specific diagnosis) and becomes type of the genus by original designation. A later publication, cited above, provided additional data concerning the characters of *Scolodesmus*. Altogether sufficient information was given to enable others to recognize the genus. I believe that if Attems and Brolemann had studied Cook's papers carefully, they would have realized that the species

which they described in *Dysevulusoma* were congeneric with *Scolodesmus*. Both of them placed Porat's species *scutigerinus* in *Dysevulusoma* despite the fact that Cook had already assigned it to *Scolodesmus*. There is no justification for ignoring a genus merely because the male genitalia of its species are not illustrated.

I have examined material of *S. grillator* from the Cook Collection, taken at Mount Coffee, Liberia. From one of the males drawings of the left gonopod and anterior segments have been made, and are here reproduced. It should be noted in connection with the gonopod that the tibiotarsus is represented by a rather broad subtriangular lamella, which in the drawing presents chiefly its narrow dimension toward the observer. The maximum development of the tibiotarsus is reached in *S. nigerianus* (Attems), in which species it is also turned so as to be mostly visible in mesial aspect. Some of the illustrations of Attems and Carl indicate that a free solenomerite carries the distal course of the seminal channel. In the material studied I was unable to verify this situation although microscope slides were made. Rather it appeared that the channel merely runs up the inner face of the tibiotarsus blade, although I do not wish to state conclusively that this is actually the case.

It is of interest to note that the distalmost macroseta on the gonopod femur is noticeably larger than the others, a circumstance also shown in the illustrations of several other species.

Previous writers have referred to the configuration of the second segment, but I do not believe this part of the animal has yet been figured. The illustration here given will show the slight marginal thickening and the fine ridge-like pleural carina. An interesting condition in *Scolodesmus* and related genera is the diminution of several of the post-cephalic segments which, taken with the absence of lateral keels, creates much the appearance of a large adult male paraiulid millipede!

The opportunity of studying the genitalia of *S. grillator* enables me to speak with some confidence regarding other species which I know only from the literature. I feel, from the analogy of American groups studied, that Attems' concept of generic limits, particularly in tropical forms, is somewhat too inclusive—with the result that totally unrelated species turn up in *Das Tierreich* under a common generic heading! Jeekel has already observed this state of things in connection with East Indian groups. I refer the following species to *Scolodesmus* in its restricted sense.

Scolodesmus grillator Cook

Proc. U. S. Nat. Mus., 17: 95, 1895.

Liberia: Monrovia; Mount Coffee.

Scolodesmus securis Cook

Proc. Acad. Nat. Sci. Philadelphia, 48: 265, 1896.

Gold Coast: Misahöhe.

Scolodesmus scutigerinus (Porat)

Bihang K. Sv. Vet.-Akad. Handl., 4(5): 37, 1894.

Kamerun.

Scolodesmus iuliforme (Carl)

Mem. Soc. Espan., 1: 262, 1905.

Spanish Guinea: Cabo St. Juan.

Scolodesmus volzi (Carl)

Rev. Suisse Zool., 21: 202, 1913.

Sierra Leone: Yonni, Falaba.

Scolodesmus ventriconus (Attems)

Zoologica, 30 (¾): 131, 1931.

Gold Coast: Sekondi.

Scolodesmus camerunense (Attems)

Zoologica, 30 (¾): 133, 1931.

Kamerun: Muconge Farm, Mungo River, Bibundi.

Scolodesmus nigerianus (Attems)

Zoologica, 30 (¾): 130, 1931.

Nigeria: Wari on the Benin River, Niger Delta.

Scolodesmus ehrhardti (Attems)

Mitt. Naturh. Mus. Hamburg, 18: 86, 1901.

Portugese Guinea: Bissao.

These nine species are all very closely related, differing chiefly in size, color, and the shape of the tibiotarsus and femoral process of the gonopods. Insofar as I am able to ascertain, only negligible differences obtain in body structure. A geographic range of some 3000 miles extent is represented by the known localities, nearly from Cape Verde to the Congo. That only nine species are known from so great an area engenders the suspicion that the roster of known *Scolodesmi* may well be vastly increased in future years, if the recent growth of the North American list may be taken as an indication.

Genus *Wubidesmus* Chamberlin

Wubidesmus Chamberlin, 1927, Bull. Amer. Mus. Nat. Hist., 57: 219 (type, *W. acarinatus* Chamberlin).

Dyseviulisoma (nec Brolemann) Attems, 1929, Rev. Zool. Bot. Afr., 17: 288 (in part).

Chamberlin's report on diplopods collected in the Belgian Congo recognized two genera: *Habrodesmus*, of which seven new species were described, and *Wubidesmus*, proposed for three new species differing from *Habrodesmus* in lacking lateral carinae. Comparison of Chamberlin's figures with others published by Attems indicates that the three *Wubidesmus* forms actually have little in common except the terete bodyform. Of them, I am able to dispose of *iugans* as really belonging to the genus *Eviulisoma*, in which group the gonopod presents several rather straight processes including the tibiotarsus, femoral process, and solenomerite. It is not possible to allocate *W. congoicols*, but the drawing of its gonopod indicates generic distinctness.

Wubidesmus is thus reduced to a monotypic genus, the type of which is *W. acarinatus*, described from Stanleyville. The gonopod of this species can be made out as being rather shortened and bulky, with the femoral process much reduced, the tibiotarsus forming a sort of conchoid shield, within which is a discrete curved solenomerite. It would also appear from the drawing of the gonopod shown in lateral aspect that the spermal channel does not run up the lateral side as in all of the species of *Scolodesmus*. Under the name *Dyseviulisoma anulatum* Attems has described another Congo species which has absolutely no close affinity with any of the nine *Scolodesmi* enumerated above. On the other hand, the description and figures of *anulatum* agree very nicely

with those of *ecarinatus*, considering the shortcomings of the latter. I have no hesitancy in removing *anulatum* from *Dyseviulisoma* (= *Scolodesmus*) and placing it in *Wubidesmus*. These two species may be cited as follows:

Wubidesmus ecarinatus Chamberlin

Bull. Amer. Mus. Nat. Hist., 57: 221, 1927.

Belgian Congo: Stanleyville.

Wubidesmus anulatus (Attems)

Rev. Zool. Bot. Afr., 17: 288, 1929.

Belgian Congo: Kasai, Ipamu, Ituri, Arebi, Bondo-Mabe.

In addition to the gonopod characters, *anulatus* differs from the true *Scolodesmus* species in lacking sternal spines. Unfortunately, Chamberlin does not mention the sternites of *ecarinatus*; perhaps it is possible to infer that spines would have been noted if present. These two forms both occur in the central Congo Basin, apparently a discreet zoogeographic province or district.

Attems laments the inadequacy of Chamberlinian descriptions and figures, saying "Solche Publicationen sind nicht sehr nützlich." While I agree with this sentiment, still I cannot feel that Attems devoted much time or effort to analysis of Chamberlin's diagnoses. The general attitude of European myriapodologists is reflected in a list of polydesmoids known from the Congo, given by Attems in 1937 (Rev. Zool. Bot. Afr., 30: 22). More accurately this list should have been titled as a list of Congo polydesmoids described by Attems, as his name appears with 66 of the 71 forms included. The species of Cook and Chamberlin are not mentioned.

Genus *Eoseviulisoma* Brolemann

Eviulisoma subg. *Eoseviulisoma* Brolemann, 1920, in: Alluaud & Jeannel, Voy. Afr. Or., Myr., p. 163.—Attems, 1937, Das Tierreich, 68: 208. (type: *Strongylosoma iulinum* Att.)

Eoseviulisoma was originally separated from the four species of *Eviulisoma* known to Brolemann by the peculiarities of its type species, *iulinum* Attems. This differs in lacking a process from the 5th sternite of the male, in having the groove of the 6th sternite very shallow, and in having the prefemur-femur of the gonopod longer than the rather short tibiotarsal element.

At the end of the telepodite of the gonopod there is a large rounded lobe (regarded as representative of the tibia by Attems) along the distal margin of which the solenomerite is carried; in fact there appears to be a marginal groove into which the end of solenomerite lies. Attems says "Tibiotarsus gross, aus einem breiten Seitenlappen (Tibia) der am Ende eine Führungsrinne für den Rinnenast hat, und einem kleineren Tarsus bestehend, der ziemlich deutlich gegen die Tibia abgegrenzt ist."

Taking all of the characters of *iulinum* into consideration, I think it is generically distinct from *Eviulisoma*, and thereby elevate Brolemann's subgenus name.

It would appear that another species may be referred to this particular genus. Under the name *Dyseviulisoma abnorme*, Attems has recently described an ecarinate strongylosomid from Central Africa that apparently is congeneric with *iulinum*. It is certainly not a *Scolodesmus*, and there is nothing in the published description to preclude allocation

in the present genus. The gonopod of *iulinum* is illustrated from the mesial side; that of *abnorme* from the lateral, making comparisons somewhat difficult. However, it can be seen that the main difference between the two lies only in degree of development of the distal lobe. In *abnorme* it is rather reduced, and does not shield the entire length of the solenomerite. That structure, too, is somewhat broader than in *iulinum*, but is partially enclosed distally, just as in that species.

The two agree in lacking the erect, distally bifid process from the 5th sternite of the males, and in having the construction between pro- and metazonites beaded or rugose (smooth in the other ecarinate genera). Interestingly enough, both appear to be subalpine species and occur on rather high, although widely separated mountains.

In his manual of the Strongylosomidae, Attems placed *abnorme* in Brolemann's group *Boreviulisoma* (type *lionvillei* Brol.) which he ranked as a subgenus of *Dyseviulisoma*. *B. lionvillei* is a Moroccan species, and aside from the vast difference in geographic range, is separable from *abnorme* on the basis of dissimilar gonopods, in having distinct lateral keels, and in having a regularly granular dorsum.

Eoseviulisoma iulinum (Attems)

Ergeb. Schwed. Exped. Kilimanjaro, 3 (19): 10, 1909.

Tanganyika: Mt. Kilimanjaro, Kibonoto.

Eoseviulisoma abnorme (Attems)

Rev. Zool. Bot. Afr., 30 (1): 30, 1937.

Belgian Congo: Ruwenzori, at 2050 meters.

Genus *Eviulisoma* Silvestri

Eviulisoma Silvestri, 1910, Ann. Mus. Genevo, vol. 44, p. 463.—Attems, 1929, Rev. Zool. Bot. Afr., vol. 17, p. 275 (type, *Iulidesmus cavalli* Silvestri).

Strandiellus Attems, 1927, Ann. Mus. Wien, vol. 41, p. 54 (type, *S. cervicornis* Attems [= *Eviulisoma silvestre* Carl]).

Wubidesmus (in part) Chamberlin, 1927, Bull. Amer. Mus. Nat. Hist., vol. 57, p. 221.

This genus of small ecarinate Strongylosomids is characterized chiefly by the male gonopods, which are distinctive in the following particulars: prefemur moderate in length; femur short with a moderate to large femoral process (usually enclosing the long, slender, solenomerite); tibiotarsus long and laminate, distally notched or deeply bifid. These terminal elements are generally straight, slender, and directed distad; they are much longer than the femoral division.

In the male sex, the fifth sternite bears an upright median process, and the sixth is strongly concave.

The species referred to *Eviulisoma* occupy a definite geographic area in eastern and central-eastern Africa; this range is widely removed from that inhabited by the forms of *Dyseviulosoma*.

Chamberlin's *Wubidesmus iugans* is clearly referable here, although the drawing of the gonopod is made from such an angle, that the solenomerite is not visible.

Eviulisoma cavalli (Silvestri)

Boll. Mus. Torino, 22 (560): 3, 1907.

Tanganyika: Sultanat Ihangiro, near Lake Victoria.

Eviulisoma silvestre (Carl)

Rev. Suisse Zool., 17: 300, 1909.

Tanganyika: Bukoba, near Lake Victoria.

Eviulisoma ussuwiense (Carl)

Rev. Suisse Zool., 17: 299, 1909.

Tanganyika: East-Ussuwi, south of Bukoba.

Eviulisoma jeanneli Brolemann

Alluaud & Jeannel, Voy. Afr. Or., Myr., p. 165, 1920.

Kenya: no further locality.

Eviulisoma alluaudi Brolemann

Alluaud & Jeannel, Voy. Afr. Or., Myr., p. 174, 1920.

Kenya: Aberdare Mountains.

Eviulisoma insulare Brolemann

Alluaud & Jeannel, Voy. Afr. Or., Myr., p. 174, 1920.

Tanganyika: Zanzibar, Haitajwa.

Eviulisoma iugans (Chamberlin)

Bull. Amer. Mus. Nat. Hist., 57: 221, 1927.

Belgian Congo: Medje (?).

Eviulisoma schoutedeni Attems

Rev. Zool. Bot. Afr., 17: 290, 1929.

Belgian Congo: Kasai, N'Gombe.

Eviulisoma muturanum Attems

Rev. Zool. Bot. Afr., 30: 26, 1937.

Belgian Congo: N. Kivu; Mutura.

Eviulisoma obscurum Attems

Rev. Zool. Bot. Afr., 30: 27, 1937.

Belgian Congo: Libenge.

Eviulisoma tritonium Attems

Rev. Zool. Bot. Afr., 30: 28, 1937.

Belgian Congo: N. Kivu; Nyarusambo.

Eviulisoma graueri Attems

Zool. Anz., 144: 247, 1944.

Tanganyika: northwestern portion.

Eviulisoma debile Attems

Rev. Zool. Bot. Afr., 31: 236, 1938.

Belgian Congo: Kivu, Tshibinda.

Eviulisoma egregium Attems

Rev. Zool. Bot. Afr., 31: 237, 1938.

Belgian Congo: Ituri, Mongbwalu.

Some of these forms were originally described as subspecies. In view of our very scanty knowledge of subspeciation in diplopods even in well-studied areas, it seems best to list them all as full species for the present. Attems' subspecies, in general, appear to be based mostly upon the "quality level" of differences in gonopod structure rather than upon the concepts of similar but geographically vicarious (and intergrading) populations.

Genus *Cnemodesmus* Cook

Cnemodesmus Cook, 1895, Proc. U. S., Nat. Mus., vol. 18, p. 97 (type: *Paradesmus thysanopus* Cook & Collins).

?*Phaeodesmus* Cook, 1898, Proc. U. S. Nat. Mus., col. 20, p. 696.—
Attems, 1937, Das Tierreich, lief. 68, p. 218 (type, *Orthomorpha*
longipes Attems).

Campsogon Chamberlin, 1951, Publ. Cult. da Comp. Diamantes Angola,
no. 10, p. 65 (type, *C. laquifer* Chamberlin).

Cook separated Attems' species *longipes* into a separate genus *Phaeodesmus* primarily because of the presence, at the end of the femur of the gonopod, of two elongate lateral branches not found in *Cnemodesmus thysanopus*. Attems has since (1934, *infra*) described another East African (*longipes* came from Mossambique) Strongylosomid—*Podochresimus alatus*—which is generically identical with *longipes*. *Cnemodesmus thysanopus* is a West African (Congo) species, as are several others which generally concur in gonopod structure. There is some doubt that two genera can be maintained, despite an apparent correlation of gonopod structure with different geographic regions, and it seems best to include *Phaeodesmus* with the older name *Cnemodesmus*. Attems, indeed, joined the two genera in his 1937 monograph, but unfortunately used the younger name for the group!

Chamberlin's two species of his "new" genus *Campsogon* do not seem generically separable from *C. thysanopus*, particularly when the somewhat intermediate *C. miles* (Attems) is considered. This latter species, from Bihe District, Angola, is quite similar to *C. iugans* of Chamberlin.

The species of *Cnemodesmus* may be listed as follows:

Cnemodesmus thysanopus (Cook & Collins)

Ann. New York Acad. Sci., 8: 25, 1893.

Belgian Congo: no further locality given.

Cnemodesmus longipes (Attems)

Mitt. Mus. Hamburg, 13: 25, 1896.

Mossambique: Quelimane.

Cnemodesmus alatus (Attems)

Ann. South African Mus., 26: 244, 1928.

Portugese East Africa: Nyaka, Inhambanc.

Cnemodesmus miles (Attems)

Senckenbergiana, 16: 5, 1934.

Angola: Bihe District.

Cnemodesmus iugans (Chamberlin)

Publ. Cult. Comp. Diamantes Angola, 10: 67, 1951.

Angola: Lunda District, vicinity of Dundo.

Cnemodesmus laquifer (Chamberlin)

Publ. Cult. Comp. Diamantes Angola, 10: 66, 1951.

Angola: Malange District, 40 km. west of Malange.

Cnemodesmus Aloysii-Sabaudiae Silvestri

Boll. Mus. Torino, 22 (560): 1, 1907.

Central Africa: Ibanda, Mobuku.

Cnemodesmus convolutus (Attems)

Rev. Zool. Bot. Afr., 31: 231, 1938.

Belgian Congo: Kwango.

Genus *Dysthymus* Attems

Dysthymus Attems, 1929, Rev. Zool. Bot. Afr., vol. 17, p. 276; 1937,
Das Tierreich, lief. 68, p. 156 (type, *D. brunneus* Attems).

Lundacus Chamberlin, 1951, Publ. Cult. da Comp. Diamantes Angola, no. 10, p. 69 (type, *L. atopus* Chamberlin).

The proposal of *Lundacus* by Chamberlin represents another of the lamentably numerous instances of generic synonymy which might have been prevented by a little care. In many cases, as when the older names are poorly diagnosed or published in obscure journals, a redundant junior synonym may be forgiven. In this case, however, we must infer that Chamberlin has access to the paper in which *Dysthymus* was proposed, since he refers to it further along in his own paper on the Angolan collection!

Comparison of the drawings given by Attems and Chamberlin leaves no doubt that the type species of their two genera are congeneric. As a matter of fact, the gonopods are so remarkably similar that one is inclined to suspect only subspecific differences between *brunneus* and *atopus*. The type localities of the two are in the adjoining districts of Angola and the Belgian Congo.

In all of its facets this situation is a very disappointing and melancholy one, for which there can be no explanation other than a most careless and indifferent approach.

The species now referred to *Dysthymus* may be listed as follows (I am dubious that *debilis* really belongs in this genus):

Dysthymus brunneus Attems

Rev. Zool. Bot. Afr., 17: 295, 1929.

Belgian Congo: N'Gombe Kasai.

Dysthymus spectabilis Attems

Rev. Zool. Bot. Afr., 17: 292, 1929.

Belgian Congo: Katanga, Lukonzalwa, Kapri. Northern Rhodesia: Broken Hill.

Dysthymus debilis Attems

Zoologica, 30 (3/4): 125, 1931.

?Belgian Congo: Mkotea-Suna.

Dysthymus atopus (Chamberlin)

Publ. Cult. Comp. Diamantes Angola, 10: 69, 1951.

Angola: Dist. of Lunda; Dundo, along Luachimo River.

Dysthymus uganonus Attems

Zool. Anz., 144: 246, 1944.

Tanganyika: Ugano.

The other African genera of the Strongylosomidae, not treated in this paper, are *Habrodesmus* Cook, *Podochresimus* Attems, *Xanthodesmus* Cook, *Ectodesmus* Cook, *Congolina* Attems, and *Matebelopus* Verhoeff. *Habrodesmus* is probably polyphyletic in the current usage.

EXPLANATION OF PLATE

Fig. 1. *Scolodesmus grallator* Cook, part of head, collum, and second segment seen in lateral aspect. Fig. 2. Same, left gonopod of male, mesial aspect. Abbreviations: *c*, coxa; *pf*, prefemur; *f*, femur; *tt*, tibiotarsus.

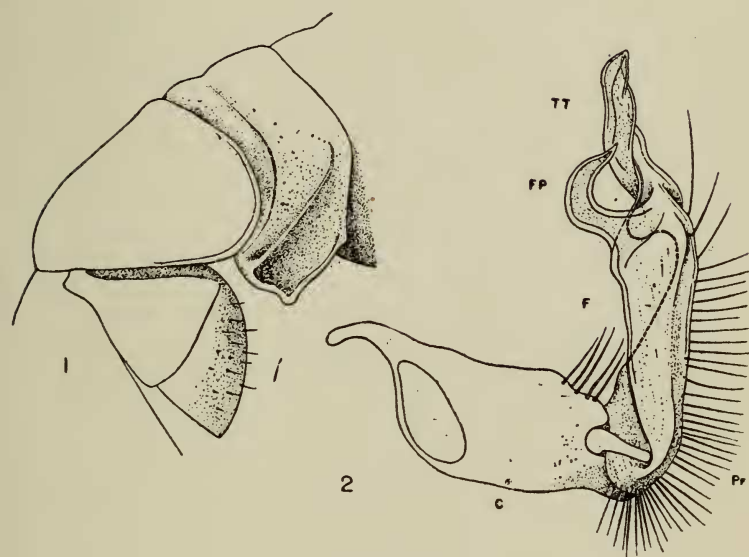


Plate IV